

Applicant : Murakami et al.
Serial No. : 09/348,515
Filed : July 7, 1999
Page : 2 of 12

Attorney's Docket No.: 16821-002001 / 2000-088-1

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently amended) A method for allocating electric vehicles, comprising the steps of:
 - sensing charge levels and location of the vehicles;
 - transmitting the charge levels and vehicle location information to a computer system at a central station;
 - tracking the charge levels and the vehicle location information at the computer system;
 - processing at the computer system the vehicle location information for a vehicle due to arrive at a port to provide an estimated arrival time of the vehicle at the port;
 - defining a vehicle search group for each port including vehicles at the port, vehicles having estimated arrival times at the port within a predetermined time interval, and including vehicles into the vehicle search group of a port vehicles that are being located at a charging facility at the port and ~~have~~ having a charging time period due to expire within a predefined time period;
 - having a user enter an expected distance of an intended trip;
 - selecting a group of vehicles from the vehicle search group in response to vehicle charge levels and based on the vehicle location information, each vehicle having a charge level adequate for the expected distance of the intended trip; and
 - allocating to a user a vehicle having a highest level of charge in the selected group.

Applicant : Murakami et al.
Serial No. : 09/348,515
Filed : July 7, 1999
Page : 3 of 12

Attorney's Docket No.: 16821-002001 / 2000-088-1

2. (Currently amended) A method for allocating one or more vehicles from a fleet of electrically powered vehicles to one or more users, wherein each vehicle has a state of charge (SOC) at any given time, the method comprising:

- sensing the SOC and vehicle location for each vehicle;
- transmitting the SOC and vehicle location information to a computer system at a central station;
- tracking the SOC and the vehicle location information at the computer system;
- processing at the computer system the vehicle location information for a vehicle due to arrive at a port to provide an estimated arrival time of the vehicle at the port;
- defining a vehicle search group for each port including vehicles at the port, vehicles having estimated arrival times at the port within a predetermined time interval, and including vehicles into the vehicle search group of a port vehicles that are being located at a charging facility at the port and have having a charging time period due to expire within a predefined time period;
- receiving a travel request from a user;
- selecting a group of one or more vehicles from the [[fleet]] vehicle search group in response to vehicle charge levels and based on the vehicle location information, each selected vehicle having an SOC sufficient to meet the travel request; and
- allocating a vehicle having a highest SOC in the group for the user.

3. (Previously presented) A method as recited in claim 2, wherein:

- receiving a travel request comprises receiving information associated with an expected distance of travel; and
- selecting a group comprises selecting one or more vehicles, each with a sufficient SOC to travel the expected distance.

4. (Previously presented) A method as recited in claim 2, wherein:

- receiving a travel request comprises receiving information associated with an expected

Applicant : Murakami et al.
Serial No. : 09/348,515
Filed : July 7, 1999
Page : 4 of 12

Attorney's Docket No.: 16821-002001 / 2000-088-1

time period of use; and

selecting a group comprises selecting one or more vehicles, each with a sufficient SOC to travel for the expected time period.

5. (Previously presented) A method as recited in claim 2, wherein:

receiving a travel request comprises receiving information associated with an expected destination port and an expected distance of travel beyond a direct route to the destination port; and

selecting a group comprises selecting one or more vehicles, each with a sufficient SOC to travel the combined distance of the direct route to the destination port and expected distance of travel beyond the direct route.

6. (Previously presented) A method as recited in claim 2, further comprising identifying the allocated vehicle to the user.

7. (Previously presented) A method as recited in claim 6, wherein identifying the allocated vehicle to the user comprises displaying identification information to the user on a display device.

8. (Previously presented) A method as recited in claim 2, wherein receiving a travel request comprises:

displaying a map to the user; and

receiving user-selected map locations on the map.

9. (Previously presented) A method as recited in claim 2, wherein: receiving a travel request from a user includes:

providing a user interface terminal at one or more ports;

receiving the travel request from a user at the user interface terminal; and

Applicant : Murakami et al.
Serial No. : 09/348,515
Filed : July 7, 1999
Page : 5 of 12

Attorney's Docket No.: 16821-002001 / 2000-088-1

communicating the travel request to the computer system; selecting a group of one or more vehicles from the fleet includes operating the computer system to select the group of one or more vehicles; and

allocating a vehicle having a highest SOC in the group includes operating the computer system to allocate the vehicle for the user.

10. (Previously presented) A method as recited in claim 19, wherein:

receiving a travel request comprises receiving information associated with an expected distance of travel; and

selecting a group comprises selecting one or more vehicles, each with a sufficient SOC to travel the expected distance.

11. (Previously presented) A method as recited in claim 19, wherein:

receiving a travel request comprises receiving information associated with an expected time period of use; and

selecting a group comprises selecting one or more vehicles, each with a sufficient SOC to travel for the expected time period.

12. (Previously presented) A method as recited in claim 19, wherein:

receiving a travel request comprises receiving information associated with an expected destination port and an expected distance of travel beyond a direct route to the destination port; and

selecting a group comprises selecting one or more vehicles, each with a sufficient SOC to travel the combined distance of the direct route to the destination port and expected distance of travel beyond the direct route.

13. (Previously presented) A method as recited in claim 19, further comprising identifying the vehicle allocated to the user.

Applicant : Murakami et al.
Serial No. : 09/348,515
Filed : July 7, 1999
Page : 6 of 12

Attorney's Docket No.: 16821-002001 / 2000-088-1

14. (Previously presented) A method as recited in claim 9, wherein: providing a user interface terminal at one or more ports comprises:

providing a user interface at a plurality of ports disposed at geographically remote locations relative to each other; and

defining each vehicle search group (VSG) to comprise more than one and less than all of the vehicles from the fleet; and

operating the computer system to select a group of one or more vehicles from the fleet comprises selecting the group from the VSG of the port from which travel information is received.

15-18. (Cancelled)

19. (Currently amended) A method for allocating one or more vehicles from a fleet of electric powered vehicles to one or more users, each vehicle having a state of charge (SOC) at any given time and a charging rate dependent upon the SOC, wherein a plot of the SOC of the vehicle being charged versus time defines a generally linear region below an SOC level and a nonlinear region above the SOC level, the method comprising:

sensing the SOC and vehicle location for each vehicle;

transmitting the SOC and vehicle location information to a computer system at a central station;

tracking the SOC and the vehicle location information at the computer system;

processing at the computer system the vehicle location information for a vehicle due to arrive at a port to provide an estimated arrival time of the vehicle at the port;

defining a vehicle search group for each port including vehicles at the port, vehicles having estimated arrival times at the port within a predetermined time interval, and including vehicles into the vehicle search group of a port vehicles that are being located at a charging

Applicant : Murakami et al.
Serial No. : 09/348,515
Filed : July 7, 1999
Page : 7 of 12

Attorney's Docket No.: 16821-002001 / 2000-088-1

facility at the port and ~~have~~ having a charging time period due to expire within a predefined time period;

receiving a travel request from a user;

selecting a group of one or more vehicles from the ~~[[fleet]]~~ vehicle search group in response to vehicle charge levels and based on the vehicle location information, each selected vehicle having an SOC sufficient to meet the travel request from the user; and

allocating to the user a vehicle within the group having an SOC above the SOC level; and

in response to no vehicles within the group have an SOC above the SOC level,

allocating a vehicle within the group having a highest SOC for the user.

20. (Currently amended) A vehicle allocation system for allocating one or more vehicles from a fleet of electrically powered vehicles to one or more users, wherein each vehicle has a state of charge (SOC) at any given time, the vehicle allocation system comprising:

one or more ports at geographically remote locations relative to each other, each port having a user interface terminal for receiving a travel request from a user;

a computer system in communication with at least one user interface terminal and programmed

for processing the SOC information;

for including vehicles at a port and vehicles having estimated arrival time at the port with in predetermined time interval in a vehicle search group of a port;

for including vehicles in the vehicle search group of a port ~~vehicles that in response to the vehicle being are~~ located at a charging facility at the port and ~~having~~ have a charging time period due to expire within a predefined time period; and

in response to a travel request received from a user at a port, for selecting a group of one or more vehicles from ~~[[a]]~~ the vehicle search group of the port based on vehicle location information, where each selected vehicle has an SOC sufficient to meet the travel request from the user, and for allocating a vehicle having a highest SOC in the group for the user;

wherein said computer system includes a tracking system that provides said vehicle

Applicant : Murakami et al.
Serial No. : 09/348,515
Filed : July 7, 1999
Page : 8 of 12

Attorney's Docket No.: 16821-002001 / 2000-088-1

location information and the SOC information corresponding to the location of each vehicle;
a sensor associated with and installed on each vehicle for sensing the state of charge of the associated vehicle; and
a wireless communication unit associated with and installed on each vehicle and operatively coupled to the sensor on the associated vehicle for transmitting state of charge information corresponding to a state of charge sensed by the sensor.

21. (Previously presented) A system as recited in claim 20, wherein said computer system comprises a central station computer system in communication with a plurality of user interface terminals at said one or more ports.

22. (Previously presented) A system as recited in claim 20, wherein:

said user interface terminal is configured to receive the travel request including information associated with an expected distance of travel; and

said computer system is programmed for selecting the group of one or more vehicles, each with a sufficient SOC to travel the expected distance.

23. (Previously presented) A system as recited in claim 20, wherein:

said user interface terminal is configured to receive the travel request including information associated with an expected time period of use; and

said computer system is programmed for selecting the group of one or more vehicles, each with a sufficient SOC to travel for the expected time period.

24. (Previously presented) A system as recited in claim 20, wherein:

said user interface terminal is configured to receive the travel request including information associated with an expected destination port and an expected distance of travel beyond a direct route to the destination port; and

said computer system is programmed for selecting the group of one or more vehicles, each

Applicant : Murakami et al.
Serial No. : 09/348,515
Filed : July 7, 1999
Page : 9 of 12

Attorney's Docket No.: 16821-002001 / 2000-088-1

with a sufficient SOC to travel the combined distance of the direct route to the destination port and expected distance of travel beyond the direct route.

25. (Previously presented) A system as recited in claim 20, wherein each of one or more ports includes a display device for displaying identification information of the allocated vehicle to the user.

26. (Previously presented) A system as recited in claim 20, wherein each of user interface terminals comprises:

a display device for displaying a map to the user; and

an interface for receiving user-selected map locations corresponding to locations on the displayed map from the user.

27-30. (Cancelled)

31. (Previously presented) A system as recited in claim 20, wherein said computer system is further programmed for:

allocating a vehicle within the group having an SOC above a predetermined SOC level;

and

in response to no vehicles within the group have an SOC above the predetermined SOC level, allocating a vehicle within the group having the highest SOC for the user.

32. (Previously presented) A system as recited in claim 20, further comprising a plurality of vehicle subsystems associated on a one-to-one basis with the vehicles from the fleet, each vehicle subsystem including:

a status sensor configured for detecting the SOC of the vehicle; and

a data transmitter configured for transmitting information corresponding to the detected SOC to the computer system.

Applicant : Murakami et al.
Serial No. : 09/348,515
Filed : July 7, 1999
Page : 10 of 12

Attorney's Docket No.: 16821-002001 / 2000-088-1

33. (Previously presented) A system as recited in claim 20, wherein:

said user interface terminal is configured to receive the request including user identification information; and

said computer system is programmed for allocating the vehicle further in response to the user identification information.

34. (Previously presented) A system as recited in claim 33, wherein said computer system includes a storage of vehicle preference information associated with each user identification and is programmed for allocating the vehicle in accordance with the user identification information and the vehicle preference information.

35. (Previously presented) A system as recited in claim 34, wherein the vehicle preference information comprises information number of vehicle wheels, number of vehicle doors, preferred minimal SOC or range of SOC's, distance usually traveled, or usual duration of vehicle use.

36-52. (Cancelled)

53. (Previously presented) A method as recited in claim 1, further comprising the steps of determining a charging order for vehicles at a port in response to the charge levels of the vehicles with vehicles with low charge level being charged before the vehicles with high charge levels.

54-55. (Cancelled)

56. (Previously presented) A method as recited in claim 2, further comprising determining a charging order for vehicles at a port in response to the charge levels of the vehicles with vehicles with low charge level being charged before the vehicles with high charge levels.

Applicant : Murakami et al.
Serial No. : 09/348,515
Filed : July 7, 1999
Page : 11 of 12

Attorney's Docket No.: 16821-002001 / 2000-088-1

57-58. (Cancelled)

59. (Previously presented) A method as recited in claim 19, further comprising
determining a charging order for vehicles at a port in response to the charge levels of the
vehicles with vehicles with low charge level being charged before the vehicles with high charge
levels.

60-62. (Cancelled)

63. (Previously presented) A system as recited in claim 20, wherein said computer system is
further programmed for determining a charging order for vehicles at a port in response to the
charge levels of the vehicles with vehicles with low charge level being charged before the
vehicles with high charge levels.